

WHAT IS CLAIMED IS:

1. An on-chip optical interconnection circuit, comprising:  
a plurality of circuit blocks provided on an integrated circuit chip; and  
an optical waveguide to optically connect the circuit blocks to each other, the optical waveguide being provided on the integrated circuit chip.
2. The on-chip optical interconnection circuit according to Claim 1,  
the circuit blocks being also electrically connected to each other.
3. The on-chip optical interconnection circuit according to Claim 1,  
the integrated circuit chip having micro-tile shaped elements which are electrically connected to the circuit blocks and optically connected to the optical waveguide, the micro-tile shaped elements having a light emitting function or a light receiving function.
4. The on-chip optical interconnection circuit according to Claim 3,  
each of the micro-tile shaped elements being electrically connected to the corresponding circuit blocks.
5. The on-chip optical interconnection circuit according to Claim 3,  
at least a portion of the optical waveguide covering the micro-tile shaped elements.
6. The on-chip optical interconnection circuit according to Claim 1,  
at least a portion of the optical waveguide being provided on top surfaces of the circuit blocks.
7. The on-chip optical interconnection circuit according to Claim 1,  
at least a portion of the optical waveguide being provided on the circuit blocks so as to cross the circuit blocks.
8. The on-chip optical interconnection circuit according to Claim 1,  
at least a portion of the optical waveguide being provided to bypass the circuit blocks.
9. The on-chip optical interconnection circuit according to Claim 1,  
the each circuit block being one of a CPU, a memory circuit, a DSP, a RF amplification circuit, an image sensor, and a biosensor.
10. The on-chip optical interconnection circuit according to Claim 1,  
the optical waveguide being a transmission line for data signals or clock signals.

11. The on-chip optical interconnection circuit according to Claim 3,  
further including a plurality of the micro-tile shaped elements being provided on one of the circuit blocks; and  
the optical waveguide being respectively provided for the plurality of micro-tile shaped elements provided on the one circuit block.
12. The on-chip optical interconnection circuit according to Claim 1,  
further including a plurality of the integrated circuit chips being mounted on a substrate; and  
the plurality of integrated circuit chips being optically connected to each other through at least the micro-tile shaped elements, which have a light emitting function or a light receiving function, and an optical waveguide, which is provided on the substrate.
13. The on-chip optical interconnection circuit according to Claim 1,  
further including a plurality of the integrated circuit chips being mounted on a substrate;  
the plurality of integrated circuit chips being mounted close to each other; and  
the plurality of integrated circuit chips being optically or electrically connected to each other.
14. The on-chip optical interconnection circuit according to Claim 1,  
further including a light scattering frame being dispersed in the optical waveguide in the neighborhood of at least one of the first micro-tile shaped element and the second micro-tile shaped element.
15. The on-chip optical interconnection circuit according to Claim 1,  
further including a light reflecting frame being dispersed on the optical waveguide in the neighborhood of at least one of the first micro-tile shaped element and the second micro-tile shaped element.
16. An electro-optical device, comprising:  
the on-chip optical interconnection circuit according to Claim 1.
17. An electronic apparatus, comprising:  
the on-chip optical interconnection circuit according to Claim 1.